



Materials Engineering Branch

TIP*



No. 022 Oil Reservoirs

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It was common practice to include a porous plastic block in a spacecraft lubricated device that is impregnated with oil to increase the oil capacity of the lubrication system. Calculations of the life of the lubrication system always include the oil in the reservoir. Therefore, the stated life is always beyond the design life of the spacecraft hardware. However, the oil in the reservoirs may not be readily available to perform the lubrication function, especially if low vapor pressure oil is employed.

Tests indicate that the reservoir must be heated about 10°C above room temperature, in high vacuum with volatile oils, and at least 25°C higher with the less volatile oils (such as Krytox 143 AB), in order to make the oil available. The amount of vaporized oil that condenses on the operating component (bearing or gear) depends upon the temperature of the component. Thus the reservoirs should be equipped with a means of heating them to drive out the oil when orbital operation indicates more oil is required on the component.

Be aware that most lubricants, including the Krytox 143 AB mentioned above, do not meet the acceptable vacuum outgassing criteria. They are acceptable for space flight use only when the proper design precautions are taken. Each use of a lubricant is approved on the merits of the specific application that takes into account such factors as: usage, temperature requirements, loads, speeds, continuous or intermittent operation, labyrinth seals, etc.